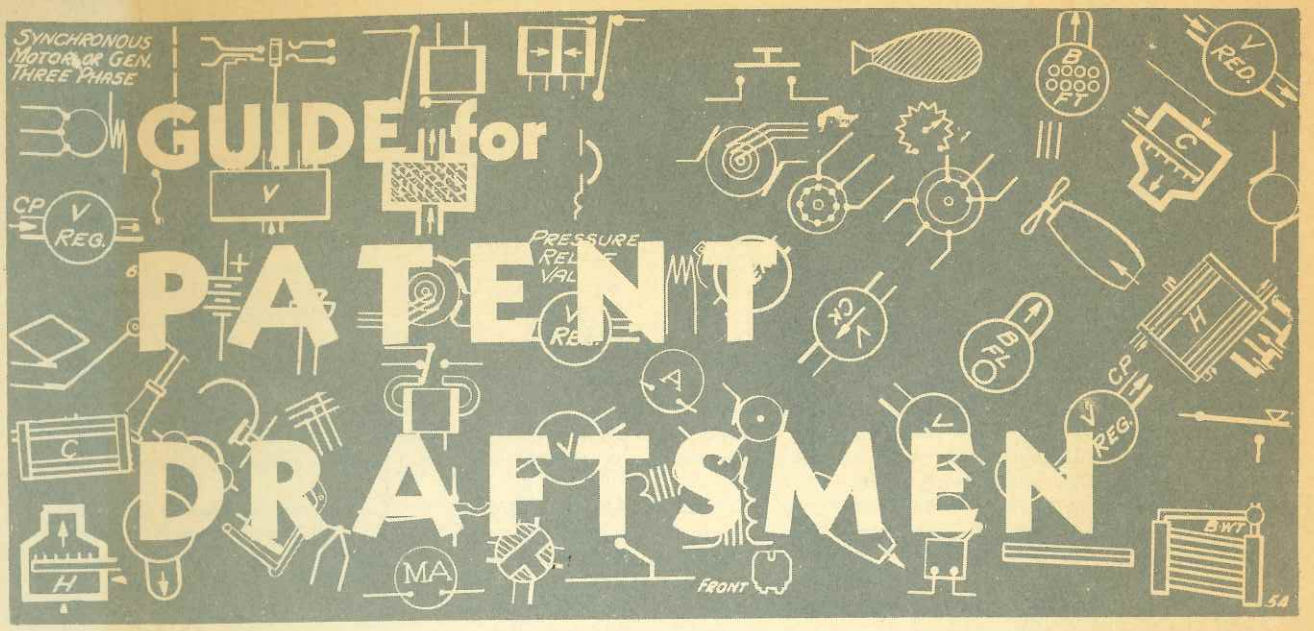


June 1953

DEPARTMENT OF COMMERCE

SINCLAIR WEEKS, *Secretary*

PATENT OFFICE

ROBERT C. WATSON, *Commissioner*

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 15 cents

SELECTED RULES OF PRACTICE RELATING TO PATENT DRAWINGS

THE DRAWINGS

81. Drawings required. The applicant for patent is required by statute to furnish a drawing of his invention whenever the nature of the case admits of it; this drawing must be filed with the application. Illustrations facilitating an understanding of the invention (for example flow sheets in cases of processes, and diagrammatic views) may also be furnished in the same manner as drawings, and may be required by the Office when considered necessary or desirable.

53 U. S. C. 113. Drawings. When the nature of the case admits, the applicant shall furnish a drawing.

82. Signature to drawing. Signatures are not required on the drawing if it accompanies and is referred to in the other papers of the application, otherwise the drawing must be signed. The drawing may be signed by the applicant in person or have the name of the applicant placed thereon followed by the signature of the attorney or agent as such.

83. Content of drawing. The drawing must show every feature of the invention specified in the claims. When the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.

84. Standards for drawings. The complete drawing is printed and published when the patent issues, and a copy is attached to the patent. This work is done by the photolithographic process, the sheets of drawings being reduced about one-third in size. In addition, a reduction of a selected portion of the drawings of each application is published in the Official Gazette. It is therefore necessary for these and other reasons that the character of each drawing be brought as nearly as possible to a uniform standard of execution and excellence, suited to the requirements of the reproduction process and of the use of the drawings, to give the best results in the interests of inventors, of the Office, and of the public. The following regulations with respect to drawings are accordingly prescribed:

(a) *Paper and ink.* Drawings must be made upon pure white paper of a thickness corresponding to two-ply or three-ply Bristol board. The surface of the paper must be calendered and smooth and of a quality which will permit erasure and correction. India ink alone must be used for pen drawings to secure perfectly black solid lines. The use of white pigment to cover lines is not acceptable.

(b) *Size of sheet and margins.* The size of a sheet on which a drawing is made must be exactly 10 by 15 inches. One inch from its edges a single marginal line is to be drawn, leaving the "sight" precisely 8 by 13 inches. Within this margin all work must be included. One of the shorter sides of the sheet is regarded as its top, and, measuring down from the marginal line, a space of not less than 1¼ inches is to be left blank for the heading of title, name, number, and date, which will be applied subsequently by the Office in a uniform style.

(c) *Character of lines.* All drawings must be made with drafting instruments or by photolithographic process which will give them satisfactory reproduction characteristics. Every line and letter (signatures included) must be absolutely black. This direction applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views. All lines must be clean, sharp, and solid, and fine or crowded lines should be avoided. Solid black should not be used for sectional or surface shading. Free-hand work should be avoided wherever it is possible to do so.

(d) *Hatching and shading.* Hatching should be made by oblique parallel lines, which may be not less than about one-twentieth inch apart.

Heavy lines on the shade side of objects should be used except where they tend to thicken the work and obscure reference characters. The light should come from the upper left-hand corner at an angle of 45°. Surface delineations should be shown by proper shading, which should be open.

(e) *Scale.* The scale to which a drawing is made ought to be large enough to show the mechanism without crowding when the drawing is reduced in reproduction, and views of portions of the mechanism on a larger scale should be used when necessary to show details clearly; two or more sheets should be used if one does not give sufficient room to accomplish this end, but the number of sheets should not be more than is necessary.

(f) *Reference characters.* The different views should be consecutively numbered figures. Reference numerals (and letters, but numerals are preferred) must be plain, legible and carefully formed, and not be encircled. They should, if possible, measure at least one-eighth of an inch in height so that they may bear reduction to one twenty-fourth of an inch; and they may be slightly larger when there is sufficient room. They must not be so placed in the close and complex parts of the drawing as to interfere with a thorough comprehension of the same, and therefore should rarely cross or mingle with the lines. When necessarily grouped around a certain part, they should be placed at a little distance, at the closest point where there is available space, and connected by lines with the parts to which they refer. They should not be placed upon hatched or shaded surfaces but when necessary, a blank space may be left in the hatching or shading where the character occurs so that it shall appear perfectly distinct and separate from the work. The same part of an invention appearing in more than one view of the drawing must always be designated by the same character, and the same character must never be used to designate different parts.

(g) *Symbols, legends.* Graphical drawing symbols for conventional elements may be used when appropriate, subject to approval by the Office. The elements for which such symbols are used must be adequately identified in the specification. While descriptive matter on drawings is not permitted, suitable legends may be used, or may be required in proper cases, as in diagrammatic views and flow sheets. The lettering should be as large as, or larger than, the reference characters.

(h) *Location of signature and names.* The signature of the applicant, or the name of the applicant and signature of the attorney or agent, may be placed in the lower right-hand corner of each sheet within the marginal line, or may be placed below the lower marginal line.

(i) *Views.* The drawing must contain as many figures as may be necessary to show the invention; the figures should be consecutively numbered if possible, in the order in which they appear. The figures may be plan, elevation, section, or perspective views, and detail views of portions or elements, on a larger scale if necessary may also be used. Exploded views, with the separated parts of the same figure embraced by a bracket, to show the relationship or order of assembly of various parts are permissible. When necessary a view of a large machine or device in its entirety may be broken and extended over several sheets if there is no loss in facility of understanding the view (the different parts should be identified by the same figure number but followed by the letters, *a*, *b*, *c*, etc., for each part). The plane upon which a sectional view is taken should be indicated on the general view by a broken line, the ends of which should be designated by numerals corresponding to the figure number of the sectional view and have arrows applied to indicate the direction in which the view is taken. A moved position may be shown by a broken line superimposed upon a suitable figure if this can be done without crowding, otherwise a separate figure must be used for this purpose. Modified forms of construction can only be shown in separate figures. Views should not be connected by projection lines nor should center lines be used.

(j) *Arrangement of views.* All views on the same sheet must stand in the same direction and should, if possible, stand so that they can be read with the sheet held in an upright position. If views longer than the width of the sheet are necessary for the clearest illustration of the invention, the sheet may be turned on its side. The space for a heading must then be reserved at the right and the signatures placed at the left, occupying the same space and position on the sheet as in the upright views and being horizontal when the sheet is held in an upright position. One figure must not be placed upon another or within the outline of another.

(k) *Figure for Official Gazette.* The drawing should, as far as possible, be so planned that one of the views will be suitable for publication in the Official Gazette as the illustration of the invention.

(l) *Extraneous matter.* An agent's or attorney's stamp, or address, or other extraneous matter, will not be permitted upon the face of a drawing, within or without the marginal line, except that the title of the invention and identifying indicia, to distinguish from other drawings filed at the same time, may be placed below the lower margin.

(m) *Transmission of drawings.* Drawings transmitted to the Office should be sent flat, protected by a sheet of heavy binder's board, or may be rolled for transmission in a suitable mailing tube; but must never be folded. If received creased or mutilated, new drawings will be required.

85. Informal drawings. The requirements of rule 84 relating to drawings will be strictly enforced. A drawing not executed in conformity thereto may be admitted for purpose of examination, but in such case the drawing must be corrected or a new one furnished, as required. The necessary corrections will be made by the Office upon applicant's request and at his expense.

86. Draftsman to make drawings. Applicants are advised to employ competent draftsmen to make their drawings.

The Office may furnish the drawings at the applicant's expense as promptly as its draftsmen can make them, for applicants who cannot otherwise conveniently procure them.

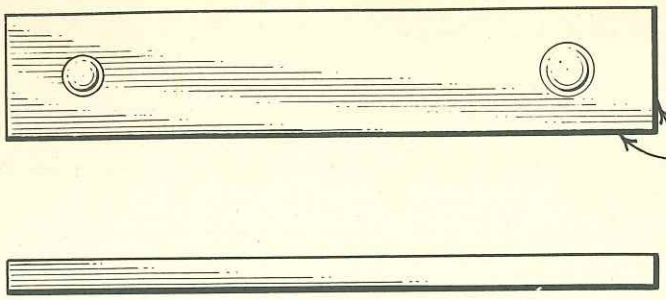
87. Return of drawings. The drawings of an accepted application will not be returned to the applicant except for signature.

A photographic print is made of the drawing of an accepted application.

88. Use of old drawings. If the drawings of a new application are to be identical with the drawings of a previous application of the applicant on file in the Office, or with part of such drawings, the old drawings or any sheets thereof may be used if the prior application is, or is about to be, abandoned, or if the sheets to be used are cancelled in the prior application. The new application must be accompanied by a letter requesting the transfer of the drawings, which should be completely identified.

DESIGN PATENTS

152. Drawing. The design must be represented by a drawing made in conformity with the rules laid down for drawings of mechanical inventions and must contain a sufficient number of views to constitute a complete disclosure of the appearance of the article. Appropriate surface shading must be used to show the character or contour of the surfaces represented.



ALWAYS USE PLAIN BLOCK LETTERING
FOR LEGENDS NAMES, ETC.

WATER
INSULATION
COPPER
OIL

1234567890

SOME STYLES OF LETTERING
USED ON PATENT DRAWINGS

Fig. 1.

FIG. 1.

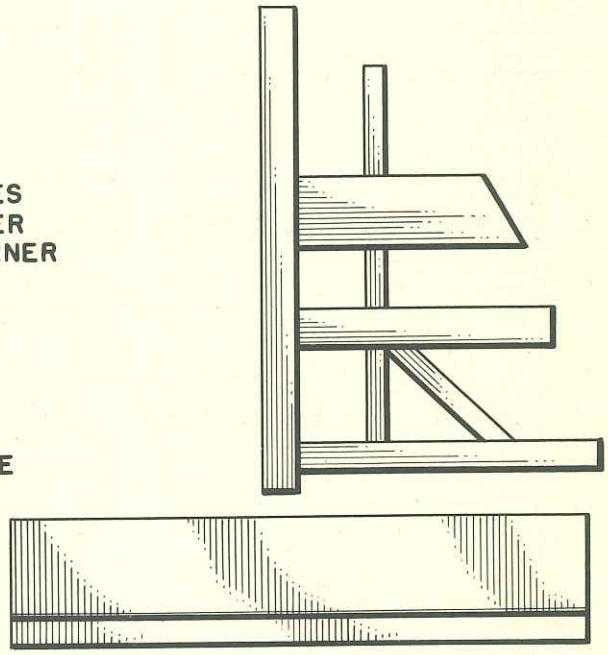
Fig. 1.

Fig. 1

ALL FIGS. MUST BE SEPARATELY NUMBERED

THE LIGHT COMES
FROM THE UPPER
LEFT-HAND CORNER
AT AN ANGLE
OF 45°

ALWAYS MAKE
SHADE LINES
ON SHADOW SIDE



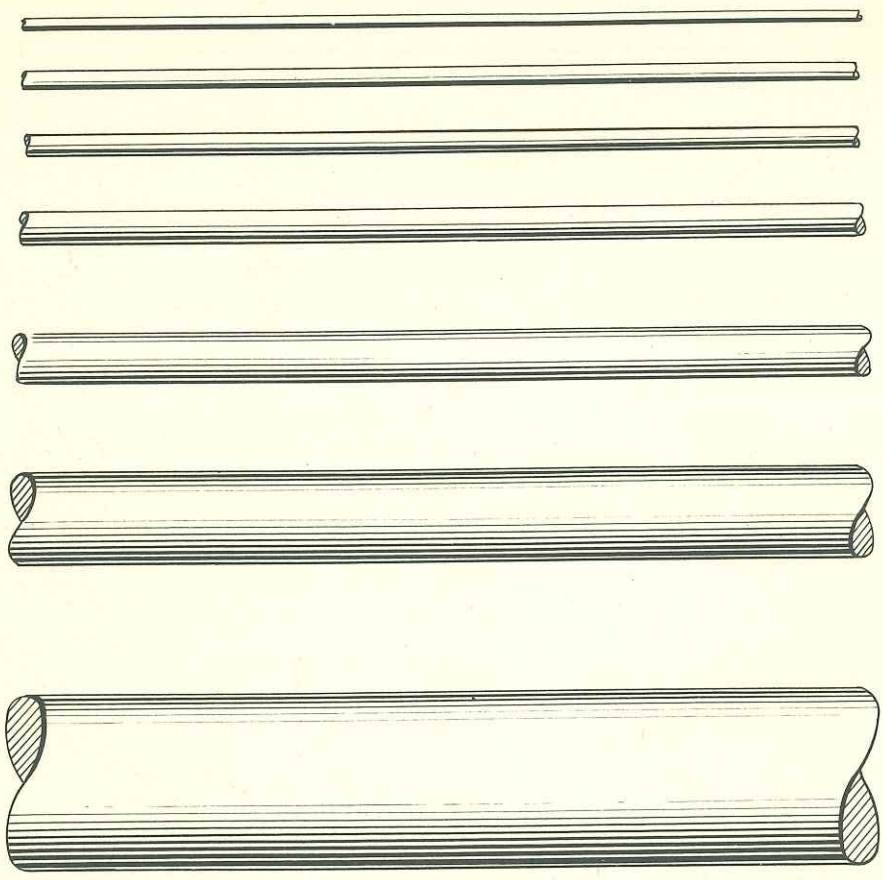
Letters and figures of reference must be carefully formed. Several types of lettering and figure marks are shown, however, the draftsman may use any style of lettering that he may choose.

Place heavy lines on the shade side of objects, assuming that the light is coming from the upper left-hand corner at an angle of 45°. Make these heavy lines the same weight throughout the various views on the drawing.

Descriptive matter is not permitted on patent drawings. Legends may be applied when necessary but only plain black lettering should be used.

The different views should be consecutively numbered.

SURFACE SHADING FOR VARIOUS SIZES OF PIPES & SHAFTS



SURFACE SHADING FOR SPHERICAL OBJECTS

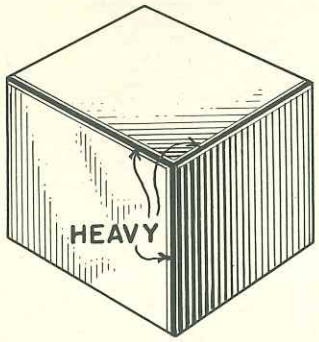
Surface delineations should be shown by proper shading. The figures show various types of surface shading. The amount of shading necessary depends on the size of the diameter of the shaft, etc. Note that a single heavy line on the shadow side is sufficient shading for small pipes, rods and shafts. When more than one shade line is used on cylindrical surfaces, the shading is blended from the second line. Note that the outer line is a light line. This rule on shading applies to spherical as well as cylindrical surfaces.

Make all lines clear and sharp so that they will reproduce properly.

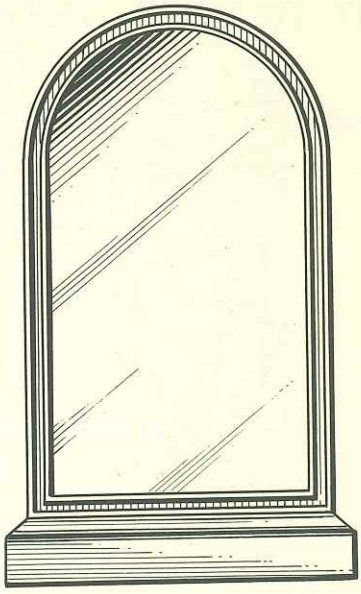
India ink alone must be used for pen drawings to secure perfectly black solid lines.

SURFACE SHADING ILLUSTRATING A MIRROR

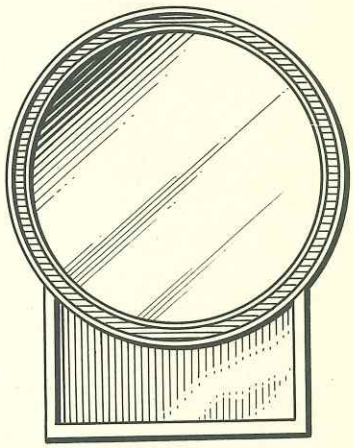
SHADING FOR A BLOCK IN PERSPECTIVE



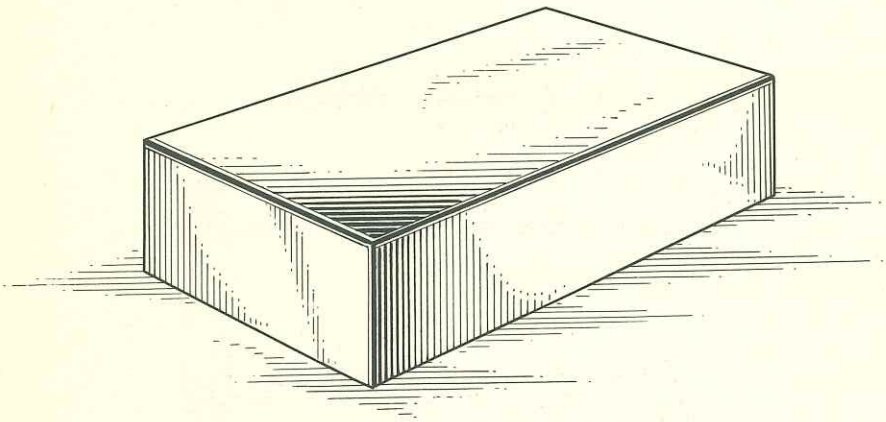
NOTE–THE HEAVY SHADE LINES ARE PLACED ON THE EDGES CLOSEST TO THE EYE



ROUND MIRROR



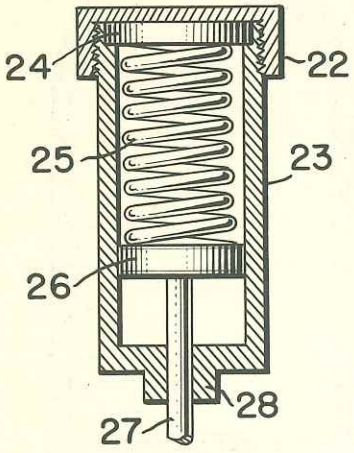
RECTANGULAR BLOCK IN PERSPECTIVE



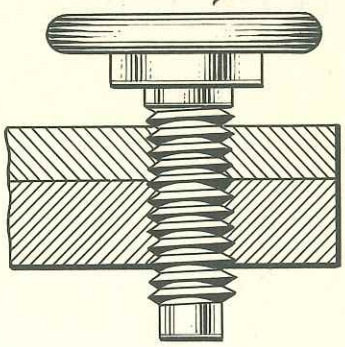
Heavy shade lines on perspective views are placed on the edges closest to the eye. The rule of the light coming from the upper left-hand corner at a 45° angle does not apply to perspective views. If a very light line is place on either side of the heavy line, a more finished appearance of the article is obtained. The addition of horizontal ground line as shown in the lower perspective view of the block emphasizes support for the same.

The appearance of a mirror or shiny surfaces can be illustrated by the oblique shading shown on the two views on the right-hand side of the page.

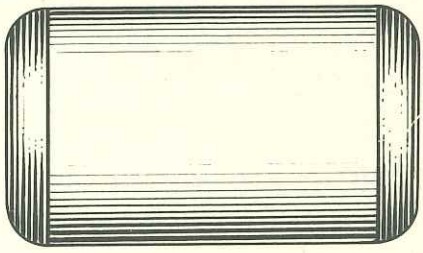
NUMERALS MUST BE PLACED AS CLOSE AS POSSIBLE TO THE PART TO WHICH THEY REFER

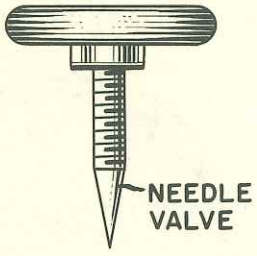


SHADING FOR ROUND HANDLES, ETC.

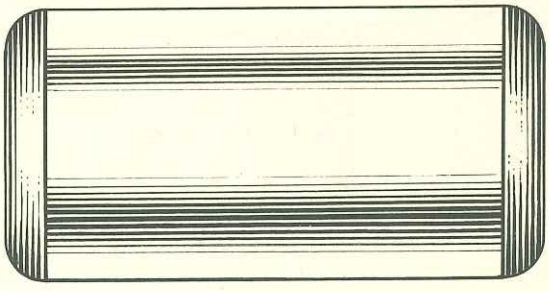


CYLINDRICAL SHADING CONVENTIONAL

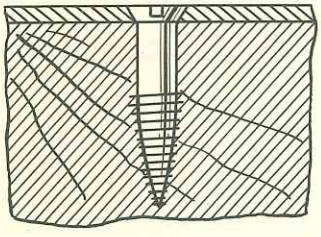




CYLINDRICAL SHADING HIGH LIGHT



WOOD SCREW

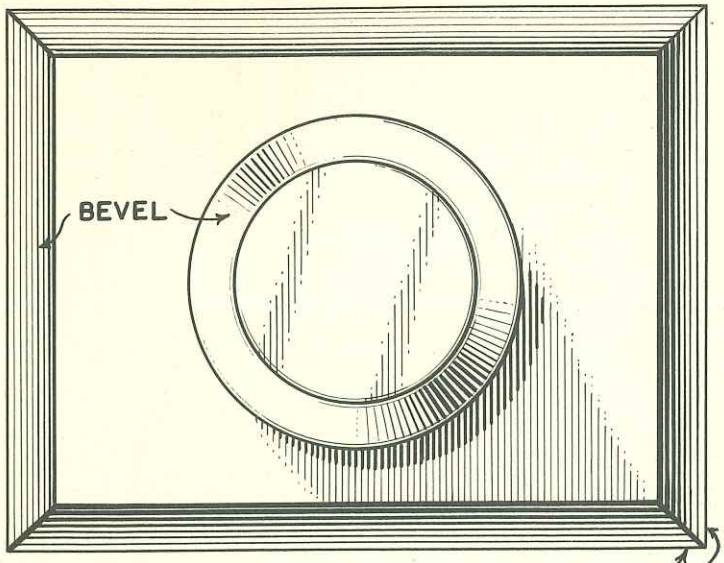


Reference characters should be placed at a little distance from the parts to which they refer. They should be connected with these parts by a short lead line, never by a long lead line. When necessary blank spaces must be left on shaded and hatched areas for applying the numerals.

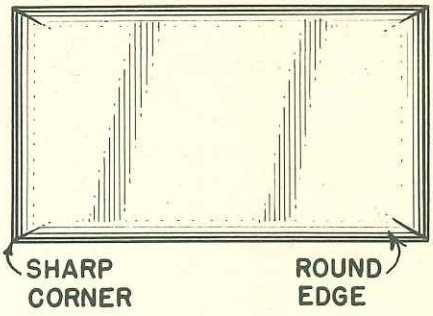
Use wood graining sparingly on parts of wood in section. Excessive wood graining is objectionable as it blurs the view and is very confusing.

Various methods of shading are shown, however, the conventional surface shading should be used until the draftsman has obtained enough experience to attempt the more involved types of shading.

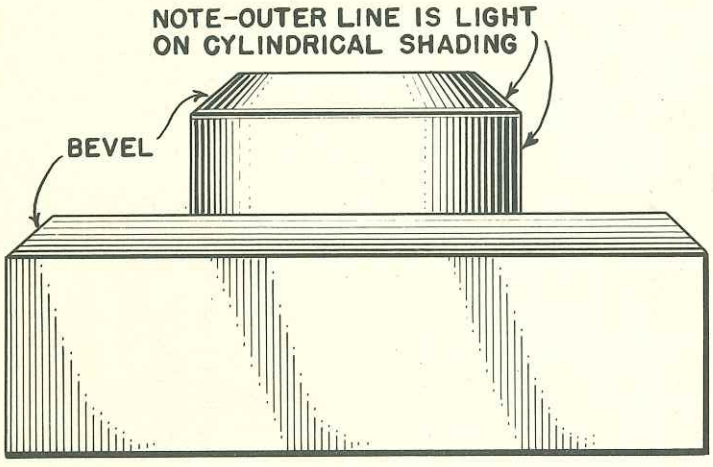
SURFACE SHADING ON BEVEL EDGES

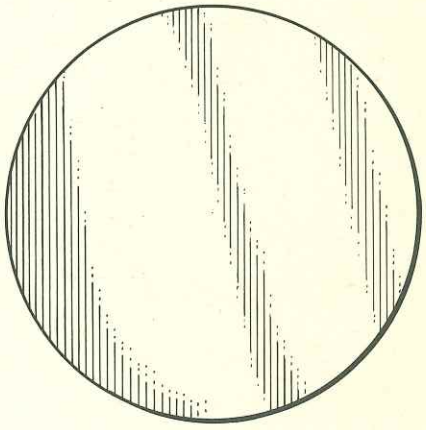


IRREGULAR SURFACE



SURFACE SHADING FOR A DISC, TABLE TOP, ETC.





Inclined surfaces are distinguished from flat surfaces by using the shading shown on the illustration in the upper left-hand corner of the page. You will note that the outer line is always a light line. This gives a slanting effect to the surface as the heavy line is placed on the edge of the upper plane. The surface shading is blended from this heavy line giving the desired appearance.

The other figures on the page show various methods of shading. Flat, shiny surfaces may be shown as illustrated in the circular figure.

The scale to which a drawing is made ought to be large enough to show the mechanism without crowding.

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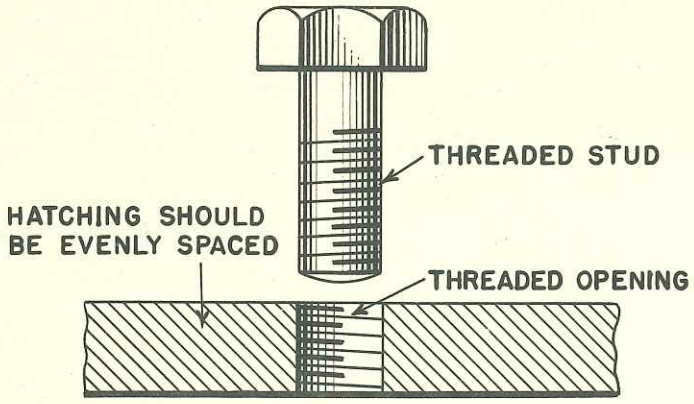
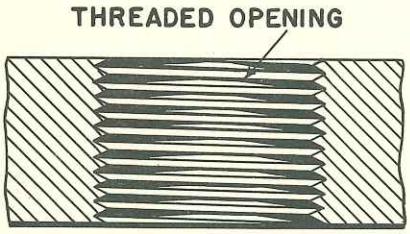
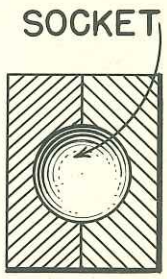
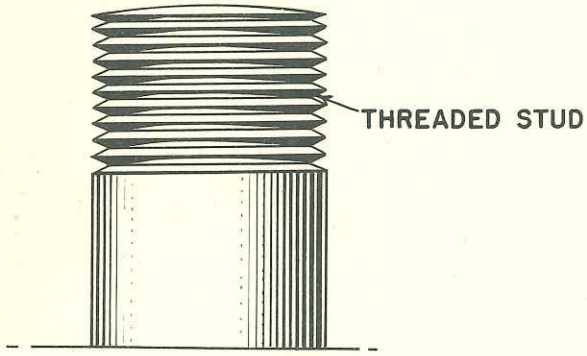
THREADS - CONVENTIONAL METHOD

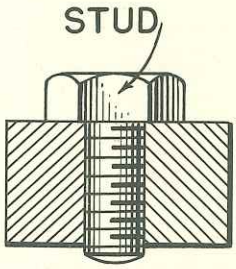




THREADS-DETAIL METHOD
USED ON LARGE PIPES





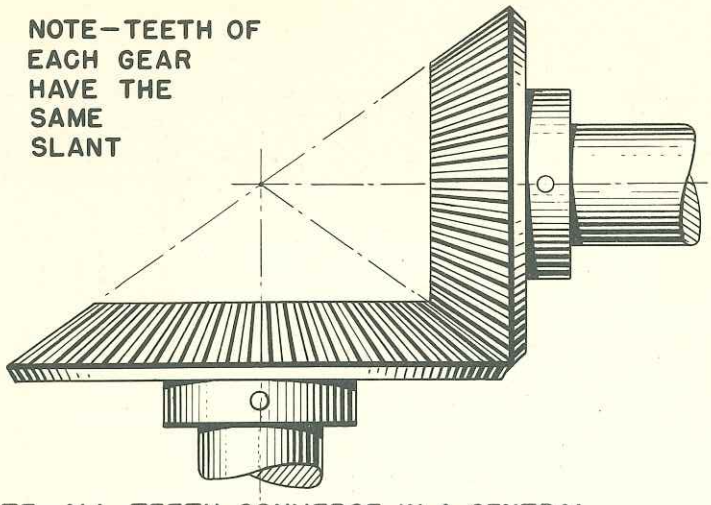


Several methods of illustrating threads are shown in the figures above. The conventional thread may be shown on small bolts and openings. The detail method should be used on large pipes and threaded portions. Solid black shading as shown is very effective in illustrating the threads but care should be used in applying same.

Convex and concave surfaces are defined by the shading shown in the illustrations of the ball and socket.

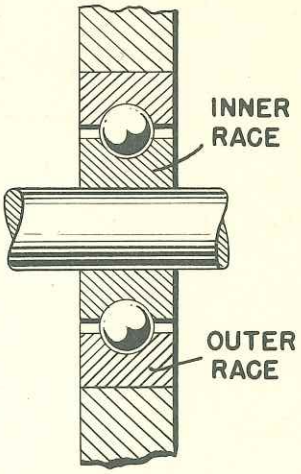
Plan the views properly so that one figure is not placed upon another or within the outline of another.

BEVEL GEARS

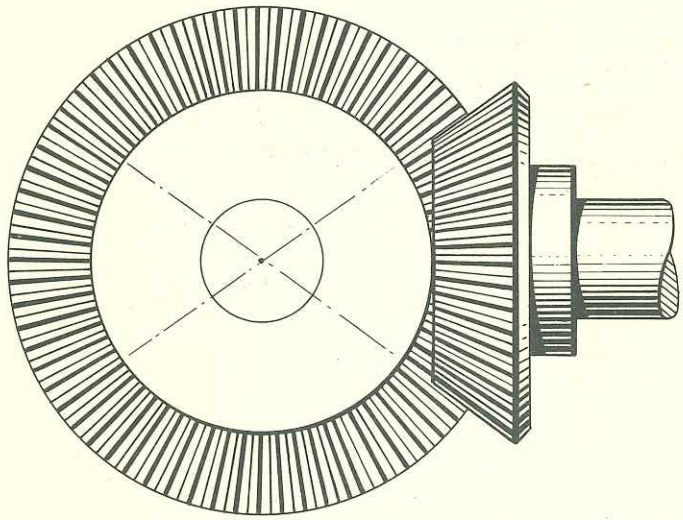


NOTE—ALL TEETH CONVERGE IN A CENTRAL POINT.—BROKEN LINES ARE FOR INSTRUCTION PURPOSES AND ARE NOT TO BE PLACED ON DRAWINGS

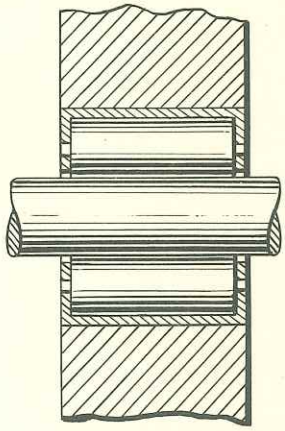
BALL BEARING



TOP PLAN VIEW



ROLLER BEARING

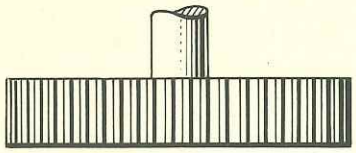


The conventional method of illustrating bevel gears is clearly shown on the two figures on the left-hand side of the page. Particular care must be given to the correct spacing between the gear teeth and also to the weight of the shade lines used. Both must be correctly shown to obtain the desired effect.

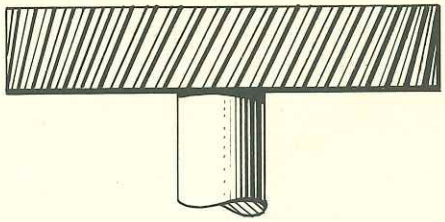
Two types of bearings are also shown. The roller bearing is clearly disclosed by the use of the conventional cylindrical shading. The fanciful black shading shown on the ball bearing is very effective in bringing out the idea of an object being shiny as well as round.

The use of white pigment to cover line is not acceptable.

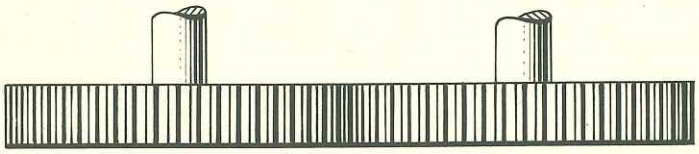
SPUR GEAR

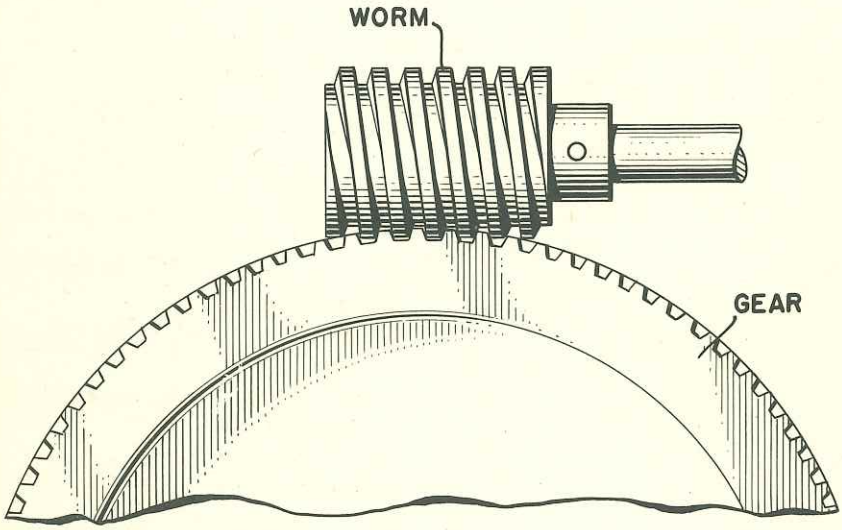


HELICAL GEAR



TWO SPUR GEARS IN MESH



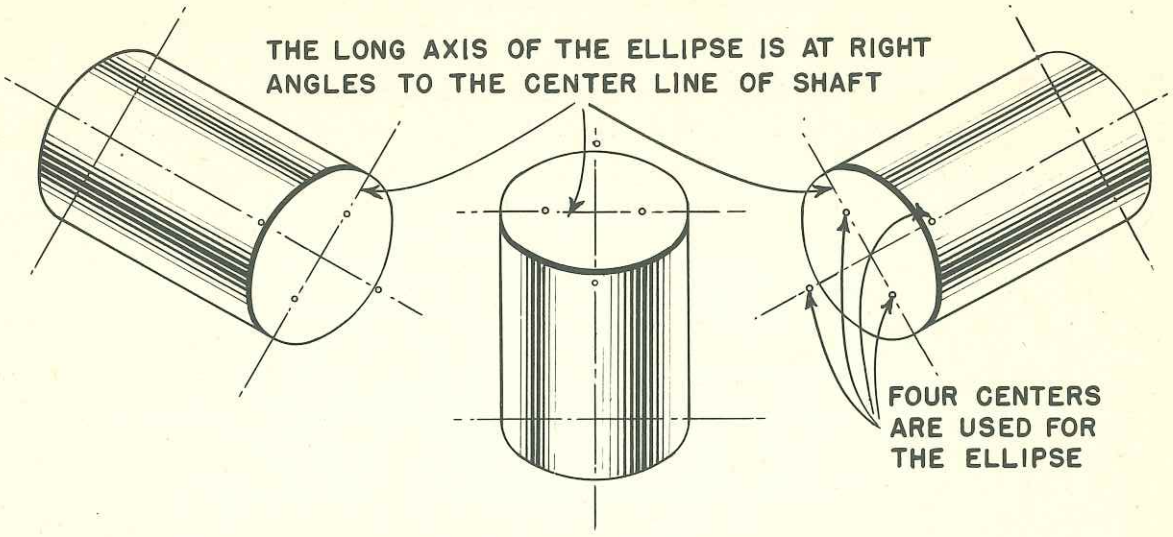


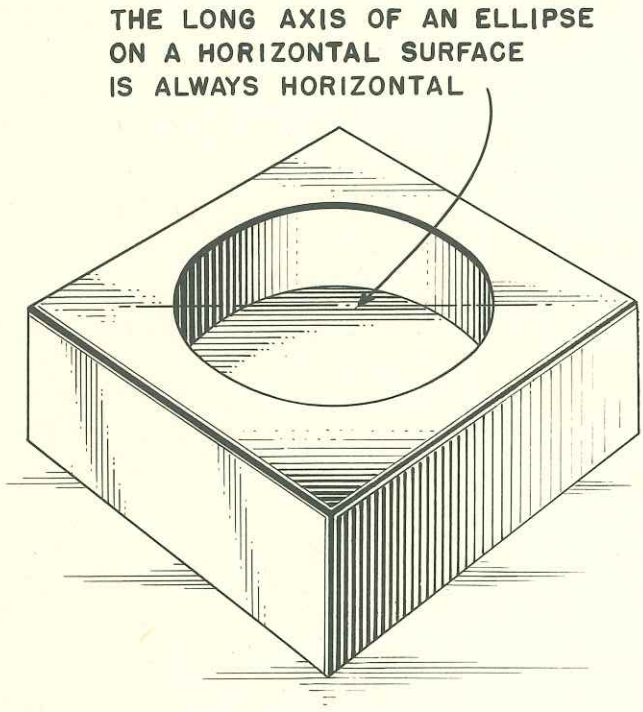
The conventional method of showing a spur gear and a helical gear is shown on the two illustrations at the top of the page. The proper spacing between the gear teeth is essential in illustrating gears in mesh as shown on the central figure.

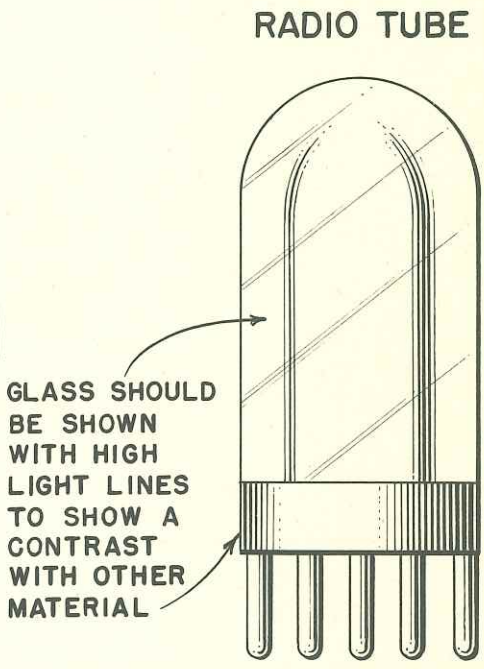
A worm and worm gear in mesh is clearly illustrated in the lower figure on the page. Do not add the legends on the drawing.

Every line and letter must be absolutely black. This direction applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views.

PERSPECTIVES





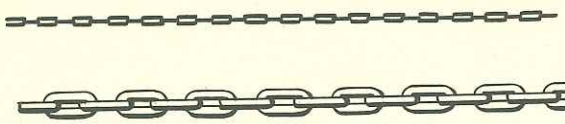


The four figures in perspective clearly explain the fundamental rules for determining the position of the long axis of the ellipse. Do not add the center lines as they are not permitted on patent drawings. These have been shown for instructive purposes only.

Different types of shading are used when it is desired to show a contrast between materials as shown in the illustration of the radio tube.

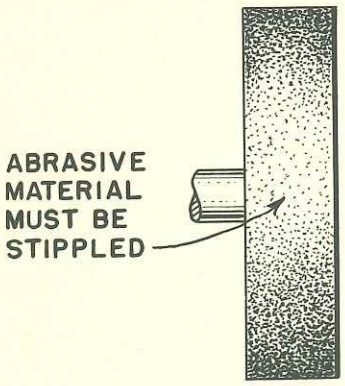
All drawings must be made with drafting instruments and every line and letter must be absolutely black. Free-hand work should be avoided wherever it is possible to do so.

LINK CHAIN
-SMALL-

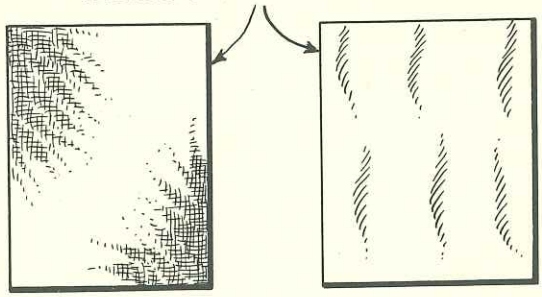


LINK CHAIN
-LARGE DETAIL-

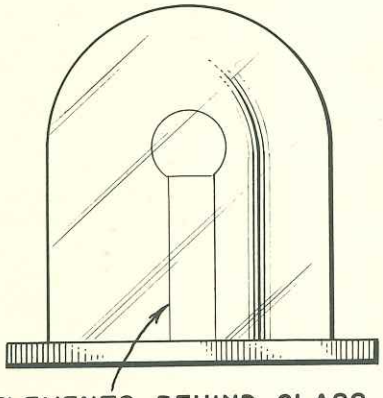
GRINDING WHEEL



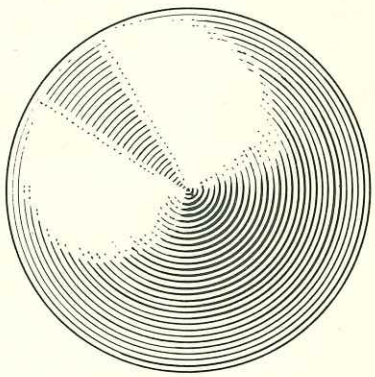
TWO METHODS OF
ILLUSTRATING FABRIC



LIGHT



ANOTHER METHOD OF
ILLUSTRATING A
CONICAL SURFACE



Two illustrations of link chains are shown at the top of the page, the size of the view being the guiding factor in determining the correct showing.

Abrasive material must be stippled as shown in the illustration of the grinding wheel. Irregular surfaces and objects that are impossible to properly show up with line shading must be stippled to bring out the desired effect.

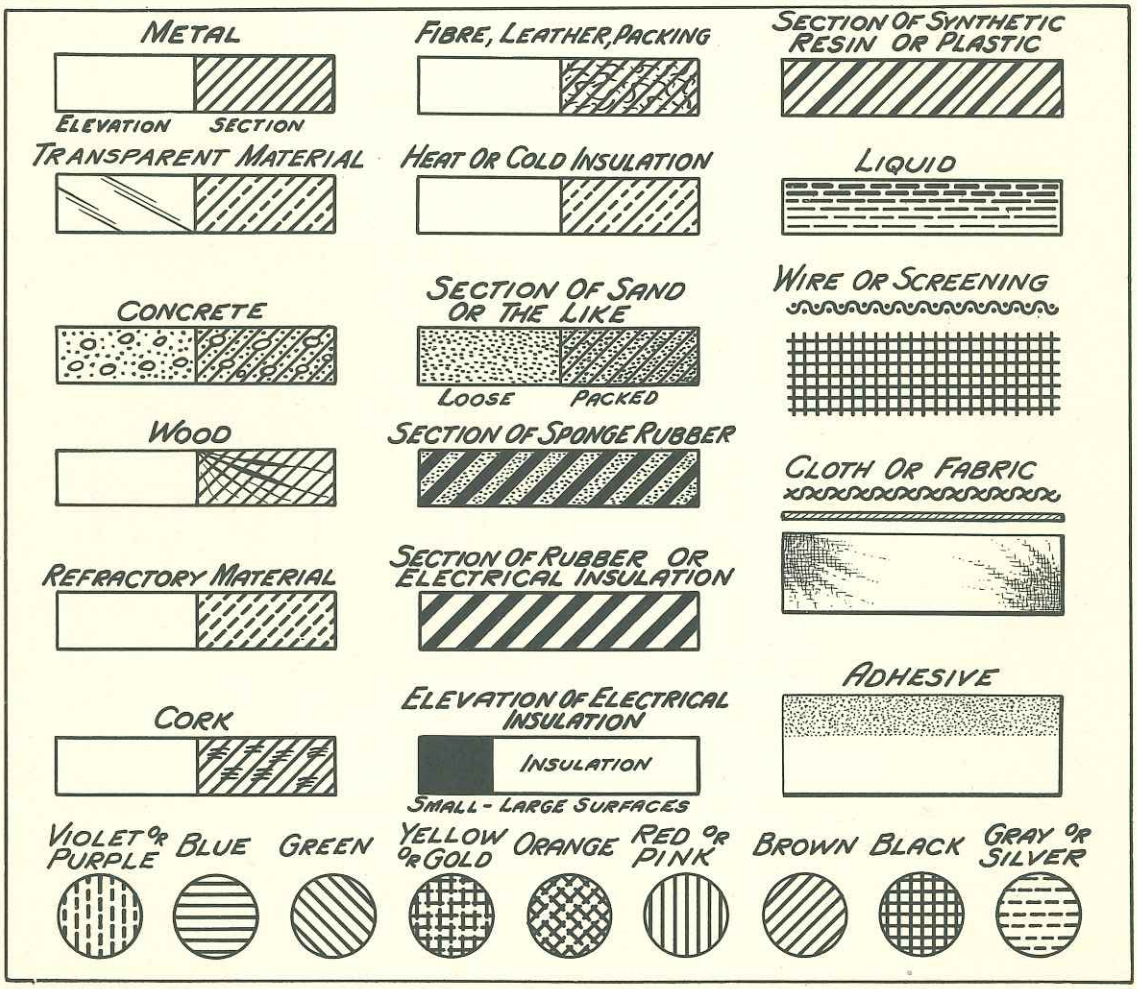
Free-hand shading should be used to designate fabric material.

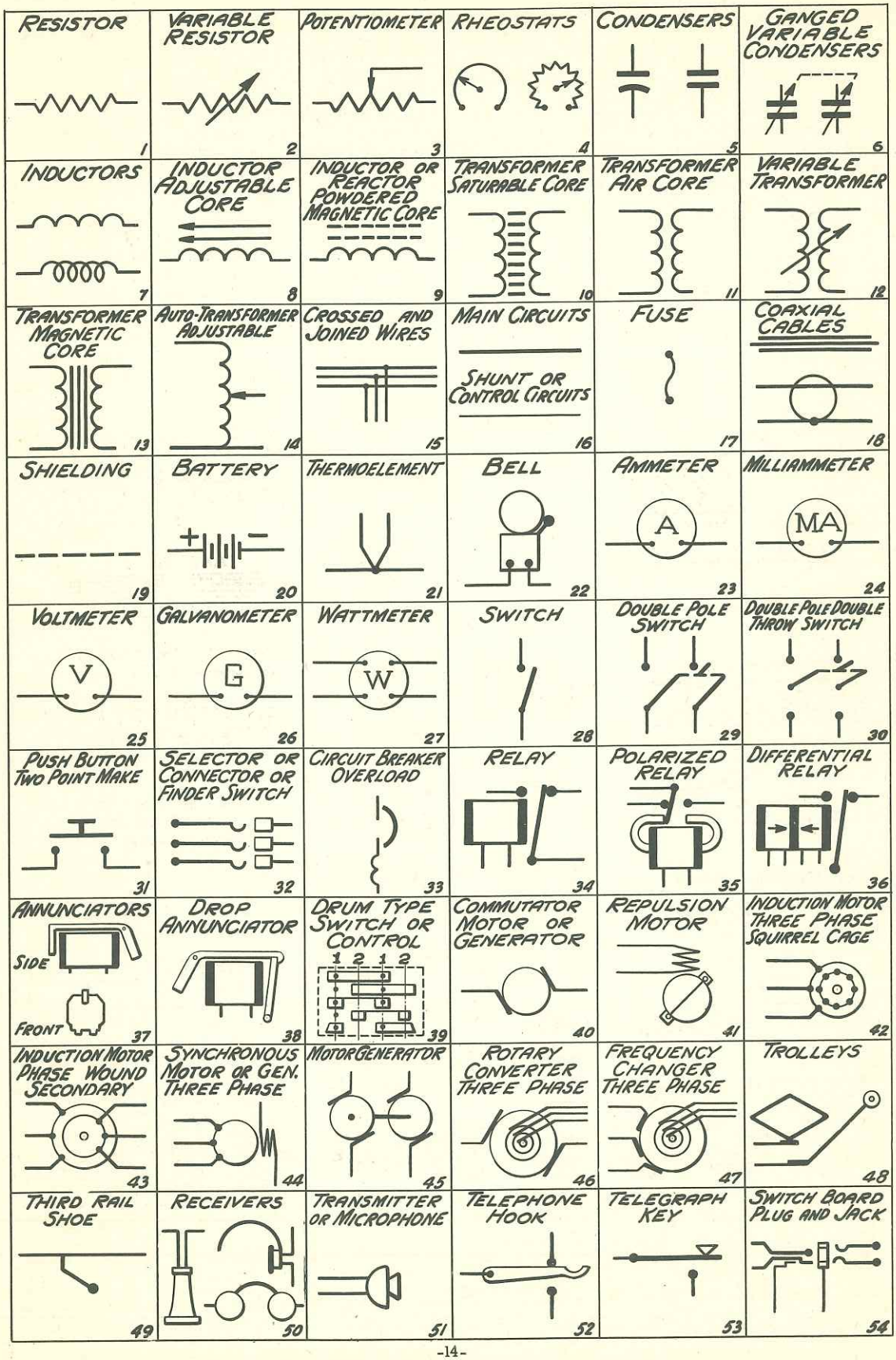
All elements behind glass should be shown in light full lines. The light oblique shade lines across the glass give the desired effect.

SYMBOLS FOR DRAFTSMEN

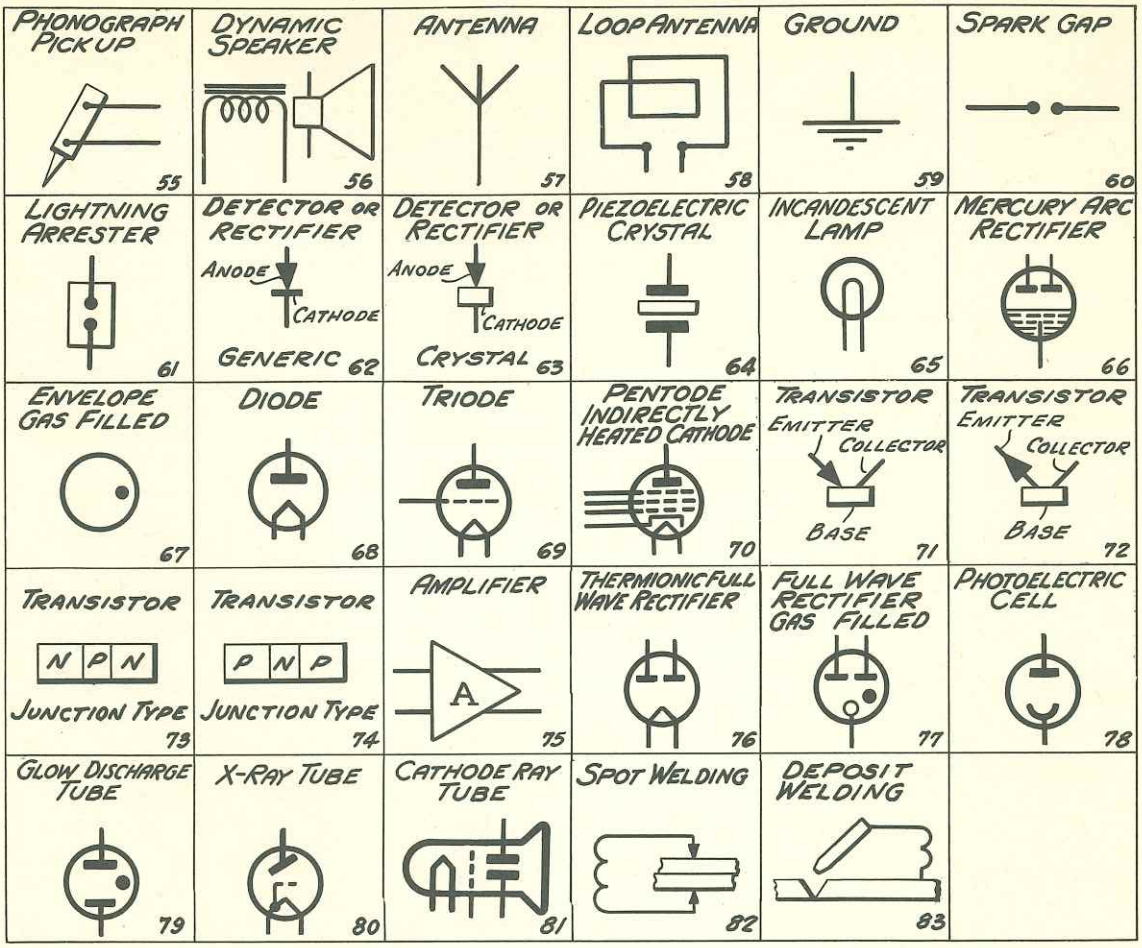
Rule 84 (g) states that graphical symbols for conventional elements may be used on the drawing when appropriate, subject to approval by the Office. The symbols and other conventional devices which follow have been and are approved for such use. This collection does not purport to be exhaustive, other standard and commonly used symbols will also be acceptable provided they are clearly understood, are adequately identified in the specification as filed, and do not create confusion with other symbols used in patent drawings.

NOTES: In general, in lieu of a symbol, a conventional element, combination or circuit may be shown by an appropriately labeled rectangle, square, or circle; abbreviations should not be used unless their meaning is evident and not confusing with the abbreviations used in the suggested symbols. In the electrical symbols an arrow through an element indicates variability thereof, see for example symbols 2, 6, 12; dotted line connection of arrows indicates ganging thereof, see symbol 6; inherent property (as resistance) may be indicated by showing symbol (for resistor) in dotted lines.

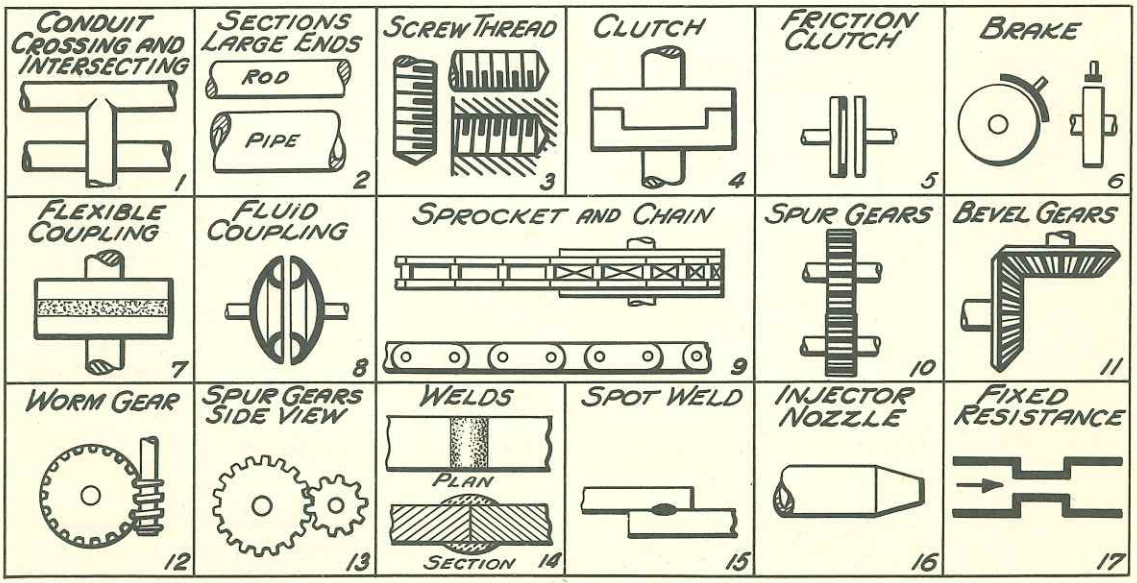


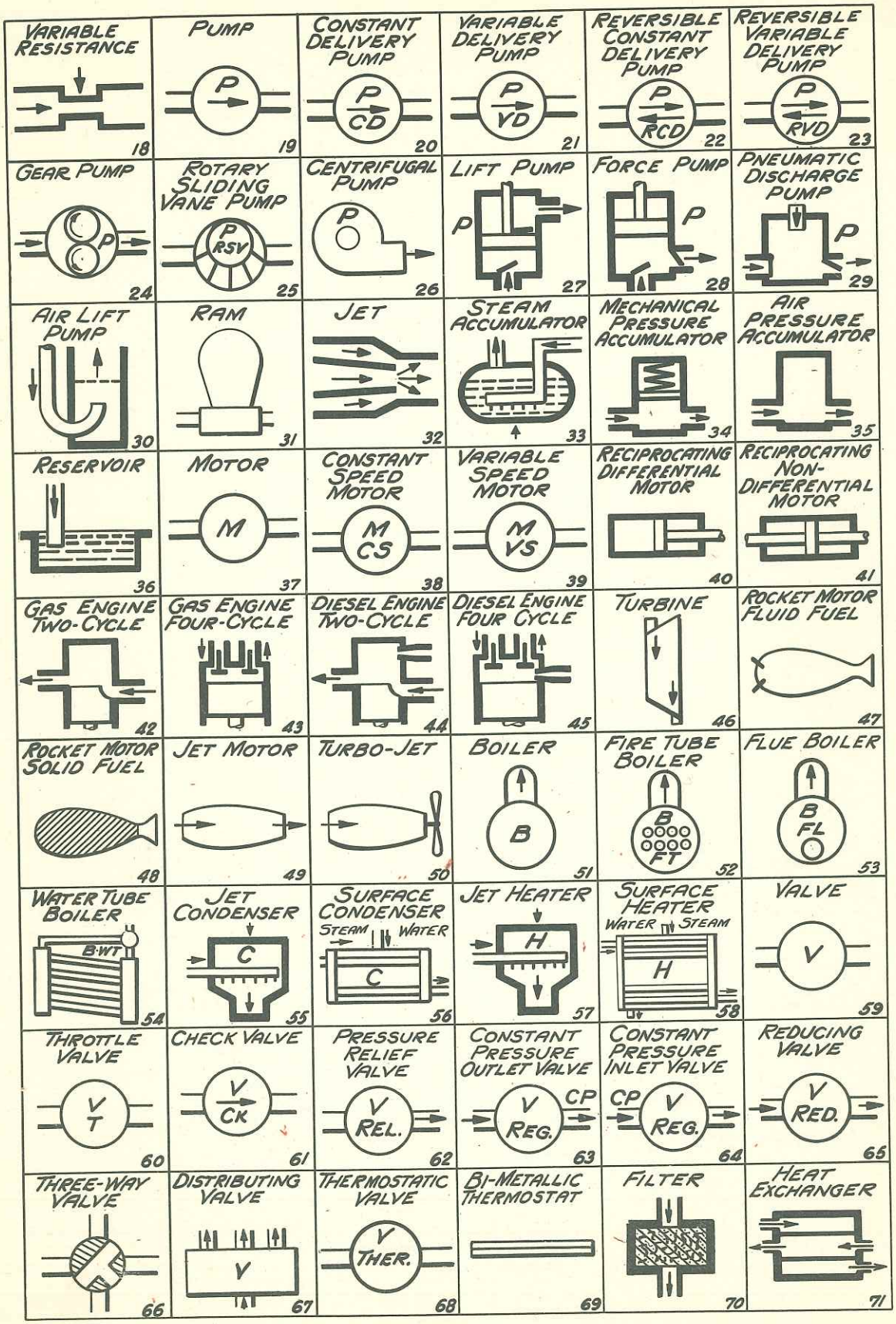

RESISTOR
1
VARIABLE RESISTOR
2
POTENTIOMETER
3
RHEOSTATS
4
CONDENSERS
5
GANGED VARIABLE CONDENSERS
6
INDUCTORS
7
INDUCTOR ADJUSTABLE CORE
8
INDUCTOR OR REACTOR POWDERED MAGNETIC CORE
9
TRANSFORMER SATURABLE CORE
10
TRANSFORMER AIR CORE
11
VARIABLE TRANSFORMER
12
TRANSFORMER MAGNETIC CORE
13
AUTO-TRANSFORMER ADJUSTABLE
14
CROSSED AND JOINED WIRES
15
MAIN CIRCUITS
SHUNT OR CONTROL CIRCUITS
16
FUSE
17
COAXIAL CABLES
18
SHIELDING
19
BATTERY
20
THERMOELEMENT
21
BELL
22
AMMETER
A
23
MILLIAMMETER
MA
24
VOLTMETER
V
25
GALVANOMETER
G
26
WATTMETER
W
27
SWITCH
28
DOUBLE POLE SWITCH
29
DOUBLE POLE DOUBLE THROW SWITCH
30
PUSH BUTTON TWO POINT MAKE
31
SELECTOR OR CONNECTOR OR FINDER SWITCH
32
CIRCUIT BREAKER OVERLOAD
33
RELAY
34
POLARIZED RELAY
35
DIFFERENTIAL RELAY
36
ANNUNCIATORS
SIDE
FRONT
37
DROP ANNUNCIATOR
38
DRUM TYPE SWITCH OR CONTROL
1 2 1 2
39
COMMUTATOR MOTOR OR GENERATOR
40
REPULSION MOTOR
41
INDUCTION MOTOR THREE PHASE SQUIRREL CAGE
42
INDUCTION MOTOR PHASE WOUND SECONDARY
43
SYNCHRONOUS MOTOR OR GEN. THREE PHASE
44
MOTOR GENERATOR
45
ROTARY CONVERTER THREE PHASE
46
FREQUENCY CHANGER THREE PHASE
47
TROLLEYS
48
THIRD RAIL SHOE
49
RECEIVERS
50
TRANSMITTER OR MICROPHONE
51
TELEPHONE HOOK
52
TELEGRAPH KEY
53
SWITCH BOARD PLUG AND JACK
54

Electrical Symbols - continued



Mechanical Symbols





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